

R E M A R K S

I. Introduction

In response to the pending Office Action, Applicants have amended claims 51 and 52 in order to further clarify the subject matter of the present invention. In addition, new claims 58 and 59 have been added. Support for the amendments to claims 51 and 52 and for new claims 58 and 59 may be found, for example, in Fig. 12 in the drawings and in the description of the second embodiment in the specification. No new matter has been added.

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

II. Rejection Of Claims 2, 3, 5 and 51-57 Under 35 U.S.C. § 103

Claims 2, 3, 5 and 51-57 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Inoguchi (USP No. 5,900,647) in view of Onojima et al. (*Appl. Phys. Lett.*, 2003, 83(25), 5208-10). Applicants respectfully traverse the above-mentioned rejection for at least the following reasons.

With regard to the present invention, amended claims 51 and 52 recite a semiconductor device or an optoelectronic device comprising a first III-V Nitride semiconductor epitaxial film having 4H-polytype structure selectively formed in contact with a substrate having 4H-type structure, a seed layer of III-V Nitride having 4H-polytype structure selectively formed on the first III-V Nitride semiconductor epitaxial film, wherein the first III-V Nitride semiconductor epitaxial film is a 4H-AlN film, and a second III-V Nitride semiconductor epitaxial film having 4H-polytype structure formed on the first III-V Nitride semiconductor epitaxial film, wherein

said second III-V Nitride semiconductor epitaxial film contains Ga and is in contact with said seed layer.

One feature of claims 51 and 52 is that the second III-V Nitride semiconductor epitaxial film is formed by a crystal growth so that it is in contact with the seed layer selectively formed on the 4H-AlN film. As can be seen in Fig. 12 of the drawings of the present invention, an n-type 4H-GaN seed layer 1203 is formed on the 4H-AlN initial layer 1202, which is in turn formed on the 4H-SiC layer 1201. As a result of this feature, dislocation density in the second III-V Nitride semiconductor epitaxial film is remarkably reduced, and has remarkably improved properties.

It is admitted that Inoguchi fails to disclose a polytype of said III-V Nitride semiconductor epitaxial films. However, Inoguchi also fails to disclose the limitations of amended claims 51 and 52 of a seed layer of III-V Nitride having 4H-polytype structure selectively formed on a first III-V Nitride semiconductor epitaxial film, and the second III-V Nitride semiconductor epitaxial film is in contact with the seed layer.

Onojima fails to remedy this deficiency. Onojima discloses a 4H-AlN semiconductor film formed by crystal growth on a 4H-SiC substrate. For example, Fig. 2 of Onojima shows a 4H-AlN film formed directly on the 4H-SiC substrate, with no other layers formed above the 4H-AlN layer. As such, Onojima fails to disclose a seed layer selectively formed on the 4H-AlN film formed on the 4H-SiC substrate. Nor does Onojima teach or suggest a second III-V Nitride semiconductor epitaxial film formed to be in contact with the seed layer. As such, it is clear that the combination of Inoguchi and Onojima fails to disclose a seed layer of III-V Nitride having

4H-polytype structure selectively formed on said first III-V Nitride semiconductor epitaxial film, and the second III-V Nitride semiconductor epitaxial film is in contact with said seed layer.

In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. As Inoguchi and Onojima, at a minimum, fail to disclose or suggest a semiconductor device or an optoelectronic device comprising a first III-V Nitride semiconductor epitaxial film having 4H-polytype structure selectively formed in contact with a substrate having 4H-type structure, a seed layer of III-V Nitride having 4H-polytype structure selectively formed on said first III-V Nitride semiconductor epitaxial film, wherein said first III-V Nitride semiconductor epitaxial film is a 4H-AlN film, and a second III-V Nitride semiconductor epitaxial film having 4H-polytype structure formed on said first III-V Nitride semiconductor epitaxial film, wherein said second III-V Nitride semiconductor epitaxial film contains Ga and is in contact with said seed layer, it is clear that Inoguchi and Onojima, alone or in combination, fail to render amended claims 51 and 52 obvious. As such, Applicants respectfully request that the § 103 rejection of amended claims 51 and 52, and all pending dependent claims thereon, be withdrawn.

III. All Dependent Claims Are Allowable Because The Independent Claim From Which They Depend Is Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claims 51 and 52 are patentable for the reasons set forth above, it is respectfully submitted that all pending dependent claims are also in condition for allowance.

IV. Conclusion

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication of which is respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



Michael E. Fogarty Reg. No. 53,305

Michael E. Fogarty
Registration No. 36,139

600 13th Street, N.W.
Washington, DC 20005-3096
Phone: 202.756.8000 MEF/NDM:kap
Facsimile: 202.756.8087

Date: May 12, 2008

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as our correspondence address.**